METHOD FOR PRODUCTION OF A MAST SHAPED BODY

The present invention relates to a method for production of masts mainly made up of extruded, assembled mast elements and having a general cross section area comprising at least three mast elements joined at the corners by means of co-acting rail sections and channel sections. Also, the invention relates to an embodiment of the co-acting rail sections and channel sections.

Masts of this type may for example be masts intended for traffic information or lightening, such as traffic signs, light signals, full- or half gantries, street lightening, airport lightening, or similar. Such masts must both yield when exposed to collision forces and having energy absorbing properties in case of collision or other types of heavy, mechanical impacts.

Masts of this type are, dependent of required shape, formed of three or more similar extruded aluminium elements, assembled together forming the mast. The connection between two adjoining aluminium elements is obtained by means of a friction joint or cladding joint.

It has previously been proposed, for example from WO 01/36750 A1, to provide one side edge of an aluminium element with a channel section and the opposite side edge with an rail section, wherein two profile elements are joined together by forcing the wedge section of one element into the channel section of the other element and thereafter pressing the channel sections around and into frictional contact with the wedge section.

According to the prior art solutions such way of establishing a joint between to aluminium elements are both a time consuming and expensive method for joining two aluminium elements.

The objective of the present invention is to simplify this joining process and to secure a better connection between the aluminium elements, i.e. at the corners of the mast, and to arrange for a more automatic and controlled production. At the same time it is also an objective to

ensure that the joined corner areas of the mast are not detrimentally reduced and that the connection still has the required strength, both locally and globally, thus ensuring that the new solution does not affect the basis for technical type approval to be given by the authorities for such type of masts.

The above defined objectives are met by means of a joining method as further described in claim 1 and the corresponding dependent claims.

According to the invention it is feasible to produce in a continuous manner a joint having great strength and an even joint quality along the entire length of the joint. The solution according to the invention render it possible to obtain a mechanical joint in suitable premises and in controlled manner, resulting in increased production rates, high and even quality and in a cost effective production.

According to the invention a repeated precision in the joint is achieved, making it possible to reduce the material factor to be met in accordance with applicable standards used for designing and engineering of the mast elements.

The invention will be described in detail below, referring to the appended drawings, in which:

Figure 1 shows a sign supported by three masts according to the present invention;

Figure 2 shows two aluminium profiles joined together in order to form two of the sides of a four element mast prior to possible rolling operations;

Figure 3 shows corresponding aluminium profiles subsequent to a completed rolling operation, the Figure also showing the rollers on a roller tool forming the rolled connection between two aluminium corners; and

Figure 4 shows a section through an aluminium profile prior to formation of a mast profile of the type shown in Figure 1.

Figure 1 shows a traffic sign 13, supported by three masts 14. It should be appreciated that the invention is

not limited to be used in connection with masts for supporting of signs, but may be used for various purposes in connection with any masts or the like, such as masts placed along roads, airports or the like.

Figure 2 shows elements of a partly assembled four sided mast, the drawing showing two aluminium profiles 1,2 assembled, prior to clamp rolling of the joined corner 3. As shown in Figure 2 each aluminium profile 1,2 is along one longitudinal edge provided with a channel section 4, while the profile along the opposite longitudinal edge is provided with a rail section 5. The rail section 5 is designed to be inserted into the channel section 4 on adjoining aluminium profile 1,2, the two sections forming together a corner 3. The channel section 4 and the rail section 5 are clamped together by means of a roller tool (not shown), pressing said two sections 4,5 together to form a clamped corner 3.

As shown in Figure 2 the channel section 4 is, prior to connection and rolling, provided with a tapered inner wall portions 4A,4B, the two tapered wall sections 4A,4B being spaced apart by means of bottom portion 4C. Both the wall portion 4A and the wall portion 4B are equipped with indents, grooves or protruding edges 6, at least along parts of opposite wall portions 4A,4B on opposing, inner wall surfaces.

Correspondingly each aluminium element is along its opposite edge equipped with a longitudinal rail section 5 intended to be inserted into the channel section 4 and clamped. Further, the rail section 5 may, preferably on both sides, be equipped with teeth, ridges or rifles 6 at least along parts in the longitudinal direction of the profile and preferably along the areas of the channel section 4 which are equipped with corresponding teeth, rifles or ridges 6.

The purpose of the rifles, teeth or ridges 6 is to obtain an improved locking effect of two aluminium elements 1,2 upon completed rolling process.

As further shown in Figure 2, the channel section 4

between the outer channel wall 4B and the intermediate section 4C, is provided with a notch 7. Said notch 7 is dimensioned and formed in such way that no or a minimum of swage or upset of metal occur when forming the corner joint 3, i.e. the channel section 4 and the rail section 5.

The intermediate bottom section 4C of the channel section 4 is wider than the width of a corresponding rail section 5, whereby the rail section 5 in an easy manner, without complications and without applying force, may be inserted into the channel section when connecting two aluminium profiles 1,2.

Figure 3 shows a corresponding section as shown in Figure 2. As indicated in Figure 3, the corners are rolled to form a joint by means of two rollers or wheels 11,12, rotatably arranged on two parallel axes 11A,12A. The rolling tool is further equipped with means (not shown) for regulating the exerted contact pressure between the wheels or the rollers 11,12 and the joint of the corner to the corner 3 to be joined, in order to obtain necessary bonding between the elements forming the corner 3.

Figure 4 shows a section through an aluminium profile 1 prior to converting the profile to a mast profile of the type shown on Figure 1. As previously described in connection with Figure 2 and 3, the aluminium profile 1 is at one side of the profile, provided with a channel section 4 according to the invention and at the opposite side of the profile provided with a rail section 5 according to the invention. According to the embodiment shown in Figure 4, an intermediate section of the aluminium profile 1, is formed by four parallel tubular profiles 8 in the form of cylindrical tube elements. Each tubular profile 8 is connected to the adjacent profile 8 and/or channel section 4 or the rail section 5 by means of an intermediate section 9.

When producing an aluminium profile with such configuration as shown in Figure 1, a profile is firstly extruded, the profile having a cross section area and

shape as shown in Figure 4. In this initial phase the channel section 4, the rail section 5, the tubular profile 8 and the intermediate parts 9 extend in parallel along the entire longitudinal direction of the aluminium profile. During the extrusion process or in a subsequent process, longitudinal slits, at last in the two middle tubular profiles 8 are made on one and/or the opposite sides, whereupon the aluminium profile is stretched in lateral direction with respect to its longitudinal direction. In such manner a zigzag pattern as indicated in Figure 1 is obtained.

The invention is not limited to masts assembled by three or four aluminium profiles. Further, it should be appreciated that the invention is not limited to elements formed of aluminium. Other types of metal having corresponding strength and inherent properties, suitable for being rolled may also be used without deviating from the inventive idea. It should further be appreciated that that the design and configuration of the profile may also be different from the configurations shown in the Figures.